

AMENDMENTS TO THE CLAIMS:

Claim 1. (Currently amended) A light-emitting semiconductor device comprising:

a substrate;

plural semiconductor layers which are made of group III nitride group compound semiconductor formed on said substrate; and

an active layer comprising a multiple quantum well structure comprising:

a plurality of a quantum well layers ~~layer~~ which satisfy ~~satisfies~~ the formula

$Al_{1-x}In_xN$, where a composition ratio x of indium (In) is in a range of $0.1 \leq x \leq 1$; and

at least one a quantum barrier layer which satisfies the formula $Al_{1-z-y}Ga_yIn_zN$

($0 \leq y \leq 1$, $0 \leq z < 1$, $0 \leq z+y \leq 1$), alternately formed with said plurality of quantum well layers ~~layer~~,

wherein a composition ratio y of gallium (Ga) in said at least one quantum barrier layer is one of $y=1$, $y \approx 1$, and $0.9 < y \leq 1$.

Claim 2. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein said plurality of quantum well layers ~~layer~~ and said at least one quantum barrier layer are laminated together.

Claim 3-4. (Canceled)

Claim 5. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein said composition ratio y of gallium (Ga) in said at least one quantum barrier layer is $y=1$.

Claim 6. (Canceled)

Claim. 7 (Withdrawn) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 2, wherein said composition ratio x of indium (In), said composition ratio y of gallium (Ga), and a composition ratio z of indium

(In) are $y=0$ and $0 \leq z < x \leq 1$, $y \approx 0$ and $0 \leq z < x \leq 1$, or $0 \leq y < 0.1$ and $0 \leq z < x \leq 1$.

Claim 8. (Withdrawn) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 4, wherein said composition ratio x of indium (In), said composition ratio y of gallium (Ga), and a composition ratio z of indium (In) are $y=0$ and $0 \leq z < x \leq 1$, $y \approx 0$ and $0 \leq z < x \leq 1$, or $0 \leq y < 0.1$ and $0 \leq z < x \leq 1$.

Claim 9. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 2, wherein said composition ratio z of indium (In) in said at least one quantum barrier layer is one of $z=0$, $z \approx 0$, and $0 \leq z < 0.1$.

Claim 10. (Canceled)

Claim 11. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein said composition ratio z of indium (In) in said at least one quantum barrier layer is one of $z=0$, $z \approx 0$, and $0 \leq z < 0.1$.

Claim 12. (Canceled)

Claim 13. (Withdrawn) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 7, wherein said composition ratio z of indium (In) is $z=0$, $z \approx 0$, or $0 \leq z < 0.1$.

Claim 14. (Withdrawn) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 8, wherein said composition ratio z of indium (In) is $z=0$, $z \approx 0$, or $0 \leq z < 0.1$.

Claim 15. (Original) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein a thickness of said plurality of quantum well layers ~~layer~~ is in a range from 1nm to 10nm.

Claim 16. (Withdrawn-Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 14, wherein a thickness of said plurality of quantum well layers ~~layer~~ is in a range from 1nm to 10nm.

Claim 17. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein said plurality of quantum well layers ~~layer~~ comprises three to ten layers.

Claim 18. (Withdrawn-Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 16, wherein said plurality of quantum well layers ~~layer~~ comprises three to ten layers.

Claim 19. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein a thickness of said at least one quantum barrier layer is in a range from 3nm to 10nm.

Claim 20. (Withdrawn-Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 18, wherein a thickness of said at least one quantum barrier layer is in a range from 3nm to 10nm.

Claim 21. (Original) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein some parts of nitrogen (N) in said plurality of quantum well layers ~~layer~~ are substituted for group V dopants by doping group V impurities such as phosphor (P), arsenic (As), antimony (Sb), and bismuth (Bi).

Claim 22. (Currently amended) A light-emitting device using a group III nitride group compound semiconductor according to claim 1, wherein some parts of nitrogen (N) in at least one of said plurality of quantum well layers ~~layer~~ and said at least one quantum barrier layer are substituted for group V dopants by doping group V impurities such as phosphor (P), arsenic (As), antimony (Sb), and bismuth (Bi).

Claim 23. (Withdrawn-Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 14, wherein some parts of nitrogen (N) in at least one of said plurality of quantum well layers ~~layer~~ and said at least one quantum barrier layer are substituted for group V dopants by doping group V impurities such as phosphor (P), arsenic (As), antimony (Sb), and bismuth (Bi).

Claim 24. (Original) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein some parts of group III elements (Al, Ga, and In) in said plurality of quantum well layers ~~layer~~ are substituted for other group III dopants by doping group III impurities such as boron (B) and thallium (Tl).

Claim 25. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein some parts of group III elements (Al, Ga, and In) in at least one of said plurality of quantum well layers ~~layer~~ and said at least one quantum barrier layer are substituted for other group III dopants by doping group III impurities such as boron (B) and thallium (Tl).

Claim 26. (Withdrawn-Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 14, wherein some parts of group III elements (Al, Ga, and In) in at least one of said plurality of quantum well layers ~~layer~~ and said at least one quantum barrier layer are substituted for other group III dopants by doping group III impurities such as boron (B) and thallium (Tl).

Claim 27. (Original) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 22, wherein some parts of group III elements (Al, Ga, and In) in at least one of said plurality of quantum well layers ~~layer~~ and said at least one quantum barrier layer are substituted for other group III dopants by doping group III impurities such as boron (B) and thallium (Tl).

Claim 28. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein said composition ratio

x of indium (In) in said plurality of quantum well layers ~~layer~~ is $0.15 \leq x \leq 0.6$.

Claim 29. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 2, wherein said composition ratio x of indium (In) in said plurality of quantum well layers ~~layer~~ is $0.15 \leq x \leq 0.6$.

Claim 30. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein said composition ratio x of indium (In) in said plurality of quantum well layers ~~layer~~ is $0.15 \leq x \leq 0.6$.

Claim 31. (Withdrawn) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 7, wherein said composition ratio x of indium (In) is $0.15 \leq x \leq 0.6$.

Claim 32. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 9, wherein said composition ratio x of indium (In) in said plurality of quantum well layers ~~layer~~ is $0.15 \leq x \leq 0.6$.

Claim 33. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 11, wherein said composition ratio x of indium (In) in said plurality of quantum well layers ~~layer~~ is $0.15 \leq x \leq 0.6$.

Claim 34. (Withdrawn) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 13, wherein said composition ratio x of indium (In) is $0.15 \leq x \leq 0.6$.

Claim 35. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein said composition ratio x of indium (In) in said plurality of quantum well layers ~~layer~~ is $0.15 \leq x \leq 0.5$.

Claim 36. (Currently amended) A light-emitting semiconductor device using a group III

nitride group compound semiconductor according to claim 1, wherein said composition ratio x of indium (In) in said plurality of quantum well layers ~~layer~~ is $0.15 \leq x \leq 0.5$.

Claim 37. (Original) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein a thickness of said plurality of quantum well layers ~~layer~~ is in a range from 2nm to 6nm.

Claim 38. (Currently amended) A light-emitting semiconductor device using a group III nitride group compound semiconductor according to claim 1, wherein a thickness of said plurality of quantum well layers ~~layer~~ is in a range from 2nm to 6nm.

Claim 39. (Currently amended) A light-emitting semiconductor device comprising:
a substrate;
a plurality of semiconductor layers formed on said substrate, said layers comprising a group III nitride group compound semiconductor; and
an active layer comprising:
 at least one a quantum well layer comprising $\text{Al}_{1-x}\text{In}_x\text{N}$, where $0.1 \leq x \leq 1$; and
 at least one a quantum barrier layer which satisfies the formula $\text{Al}_{1-z-y}\text{Ga}_y\text{In}_z\text{N}$ ($0 \leq y \leq 1$, $0 \leq z < 1$, $0 \leq z+y \leq 1$), alternately formed with said quantum well layer,
 wherein a composition ratio y of gallium (Ga) in said quantum barrier layer is one of $y=1$, $y \approx 1$, and $0.9 < y \leq 1$.

Claim 40. (Currently amended) A light-emitting semiconductor device according to claim 39, wherein said at least one quantum barrier layer is adjacent to said at least one quantum well layer.

Claim 41. (Previously presented) A light-emitting semiconductor device according to claim 40, wherein said at least one quantum well layer comprises a plurality of quantum well layers comprising $\text{Al}_{1-x}\text{In}_x\text{N}$, where $0.1 \leq x \leq 1$, and
 wherein said at least one quantum barrier layer comprises a plurality of quantum barrier layers comprising $\text{Al}_{1-z-y}\text{Ga}_y\text{In}_z\text{N}$ ($0 \leq y \leq 1$, $0 \leq z < 1$, $0 \leq z+y \leq 1$), and alternately formed

with said plurality of quantum well layers.

Claim 42. (Previously presented) A light-emitting semiconductor device according to claim 41, wherein said plurality of quantum well layers comprises two quantum well layers having a thickness of about 4nm and comprising $\text{Al}_{0.80}\text{In}_{0.2}\text{N}$, and wherein said plurality of quantum barrier layers comprises three quantum barrier layers having a thickness of about 6nm and comprising GaN.

Claim 43. (Previously presented) A group III nitride group compound semiconductor device comprising:

a substrate; and

a light-emitting layer formed on said substrate, said light-emitting layer comprising:

a plurality of quantum well layers comprising $\text{Al}_{1-x}\text{In}_x\text{N}$, where $0.1 \leq x \leq 1$; and

a plurality of quantum barrier layers comprising $\text{Al}_{1-z-y}\text{Ga}_y\text{In}_z\text{N}$ ($0 \leq y \leq 1$,

$0 \leq z < 1$, $0 \leq z+y \leq 1$), which are alternately formed with said plurality of quantum well layers

wherein a composition ratio y of gallium (Ga) in said plurality of quantum barrier layers is one of $y=1$, $y \approx 1$, and $0.9 < y \leq 1$.